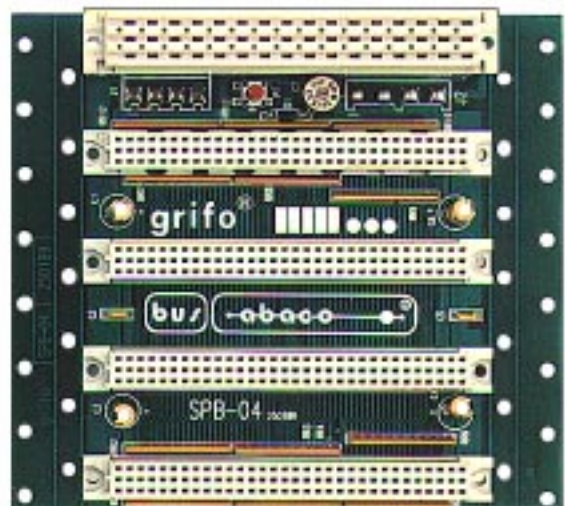
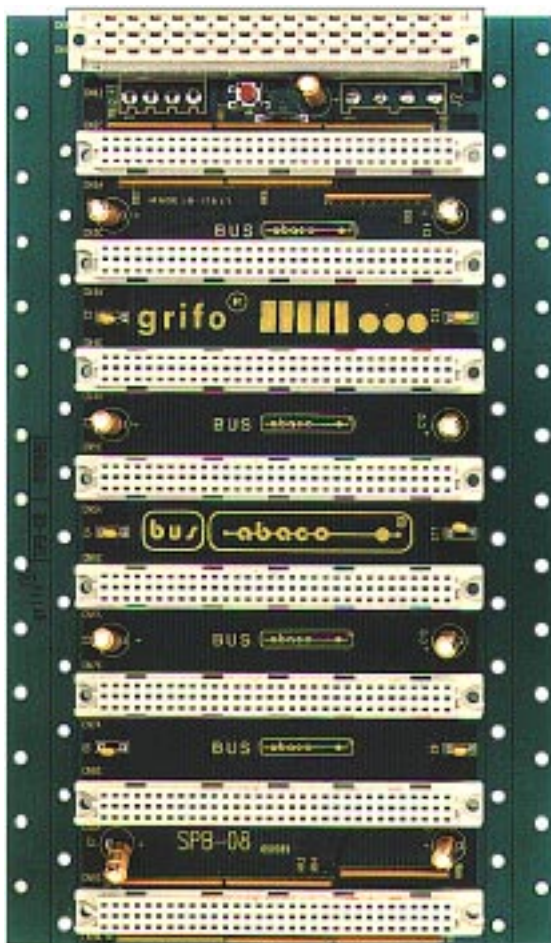


# SPB 04 SPB 08

Switch Power BUS 4 slots  
Switch Power BUS 8 slots

## TECHNICAL MANUAL



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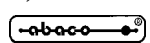
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SPB 04; SPB 08

Edition 5.00

Rel. 28 September 2000

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# SPB 04 SPB 08

Switch Power BUS 4 slots  
Switch Power BUS 8 slots

## TECHNICAL MANUAL

Mother Boards featuring 4 or 8 BUS **ABACO**<sup>®</sup> slots; pitch 5 TE; termination **resistors**; **reset** key; dual **power supply**: **stabilized** through standad supply connector or through F type connector for **SPC XXX** power supply cards; holes for **rack mounting**.

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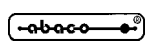


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SPB 04; SPB 08

Edition 5.00

Rel. 28 September 2000

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For specific informations on the components mounted on the card, please refer to the Data Book of the builder or second sources.

### SYMBOLS DESCRIPTION

In the manual could appear the following symbols:

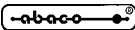


Attention: Generic danger



Attention: High voltage

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# GENERAL INDEX

<b>INTRODUCTION .....</b>	<b>1</b>
<b>CARD VERSION .....</b>	<b>1</b>
<b>GENERAL INFORMATIONS .....</b>	<b>2</b>
<b>TECHNICAL FEATURES OF SPB 04 .....</b>	<b>4</b>
<b>GENERAL FEATURES OF SPB 04 .....</b>	<b>4</b>
<b>PHYSICAL FEATURES OF SPB 04 .....</b>	<b>4</b>
<b>ELECTRIC FEATURES SPB 04 .....</b>	<b>4</b>
<b>TECHNICAL FEATURES OF SPB 08 .....</b>	<b>6</b>
<b>GENERAL FEATURES OF SPB 08 .....</b>	<b>6</b>
<b>PHYSICAL FEATURES OF SPB 08 .....</b>	<b>6</b>
<b>ELECTRIC FEATURES SPB 08 .....</b>	<b>6</b>
<b>INSTALLATION .....</b>	<b>8</b>
<b>CONNECTIONS .....</b>	<b>8</b>
<b>J1 - SUPPLY BOARD SPC XX INPUT VOLTAGES CONNECTOR .....</b>	<b>8</b>
<b>J2 - STABILIZED SUPPLY VOLTAGES CONNECTOR .....</b>	<b>10</b>
<b>CN1 - SUPPLY BOARD SPC XXX CONNECTOR .....</b>	<b>12</b>
<b>CN2,CN3,CN4,CN5,CN6,CN7,CN8,CN9 - BUS ABACO® CONNECTORS .....</b>	<b>14</b>
<b>RESET KEY .....</b>	<b>16</b>
<b>TERMINATION RESISTORS .....</b>	<b>16</b>
<b>POWER SUPPLY .....</b>	<b>16</b>
<b>EXTERNAL CARDS .....</b>	<b>18</b>
<b>APPENDIX A: ALPHABETICAL INDEX .....</b>	<b>A-1</b>

# FIGURE INDEX

FIGURE 1: SPB04 BLOCK DIAGRAM .....	3
FIGURE 2: SPB 04 COMPONENTS MAP .....	5
FIGURE 3: SPB 08 COMPONENTS MAP .....	7
FIGURE 4: J1 - SUPPLY BOARD SPC XXX INPUT VOLTAGES CONNECTOR.....	8
FIGURE 5: SPB 08 BLOCK DIAGRAM .....	9
FIGURE 6: J2 - STABILIZED SUPPLY VOLTAGES CONNECTOR.....	10
FIGURE 7: SPB 04 CONNECTORS AND RESET KEY LOCATION .....	11
FIGURE 8: CN1 - SUPPLY BOARD SPC XXX CONNECTOR .....	12
FIGURE 9: SPB 08 CONNECTORS AND RESET KEY LOCATION .....	13
FIGURE 10: CN2,CN3,CN4,CN5,CN6,CN7,CN8,CN9 - BUS ABACO® CONNECTORS .....	14
FIGURE 11: SPB 04 AND SPB 08 CARDS PHOTO .....	17



## INTRODUCTION

The use of these devices has turned - IN EXCLUSIVE WAY - to specialized personnel.

The purpose of this handbook is to give the necessary information to the cognizant and sure use of the products. They are the result of a continual and systematic elaboration of data and technical tests saved and validated from the manufacturer, related to the inside modes of certainty and quality of the information.

The reported data are destined- IN EXCLUSIVE WAY- to specialized users, that can interact with the devices in safety conditions for the persons, for the machine and for the environment, impersonating an elementary diagnostic of breakdowns and of malfunction conditions by performing simple functional verify operations , in the height respect of the actual safety and health norms.

The informations for the installation, the assemblage, the dismantlement, the handling, the adjustment, the reparation and the contingent accessories, devices etc. installation are destined - and then executable - always and in exclusive way from specialized warned and educated personnel, or directly from the TECHNICAL AUTHORIZED ASSISTANCE, in the height respect of the manufacturer recommendations and the actual safety and health norms.

The devices can't be used outside a box. The user must always insert the cards in a container that respect the actual safety normative. The protection of this container is not threshold to the only atmospheric agents, but specially to mechanic, electric, magnetic, etc. ones.

To be on good terms with the products, is necessary guarantee legibility and conservation of the manual, also for future references. In case of deterioration or more easily for technical updates, consult the AUTHORIZED TECHNICAL ASSISTANCE directly.

To prevent problems during card utilization, it is a good practice to read carefully all the informations of this manual. After this reading, the user can use the general index and the alphabetical index, respectly at the begining and at the end of the manual, to find information in a faster and more easy way.

## CARD VERSION

The present manual is reported to the boards **SPB 04** version **260595** and later and **SPB 08** version **050989** and later.

The validity of the bring informations is subordinate to the number of the card release. The user must always verify the correct correspondence among the two denotations. Version number is printed on the boards in several positions both in serigraph and in printed circuit (for example on **SPB 04** between CN2 and CN3 on the solder side and on **SPB 08** between CN8 and CN9 on the component side).

## GENERAL INFORMATION

Back panels **SPB 04** and **SPB 08** have been designed to provide the User support panels for interfacing boards that feature industrial BUS ABACO®. They can be mounted on any 3HE rack and can host 4 or 8 BUS ABACO® boards plus one grifo® power supply board in Eurocard format. This manual contains all the information needed to use Switch Power Bus 4 and 8 slots back panels obtaining the best results and profits.

**SPB 04** and **SPB 08** are the ideal choice for all the applications that must use at most 4 or 8 cards featuring BUS ABACO® plus a supply section, getting a reduction of encumbrances and an optimization of the costs.

Industrial BUS ABACO® allows the immediate connection of Eurocard format boards of the grifo® listing, which includes CPU cards, digital and analog I/O cards, axis control cards, etc.

By taking advantage of **SPB 04** and **SPB 08** mother boards becomes possible to comprise all the electronic devices (including the supply section) in a comfortable 3 HE rack, avoiding the problem to manage several containers and their numerous connections.

Should the **SPB 04** and **SPB 08** be insufficient or exceeding for the application to build, other back panels, belonging to grifo® industrial cards listing, can be used to fulfil the requirements of the User application.

**SPB 04** and **SPB 08** have the following features:

- **Pitch 5 TE**
- **Termination resistors**
- **Reset key**
- **Dual power supply:**
  - stabilized** through standad supply connector
  - through F type connector for **SPC XXX** power supply cards
- **Holes for rack mounting**
- **Mother Boards featuring 4 or 8 BUS ABACO® slots**

Here follows a description of **SPB 04** and **SPB 08** back panels' functional blocks, with an indication of the operations performed by each block. To easily locate these blocks and verify their connections please refer to figures 1 and 5.

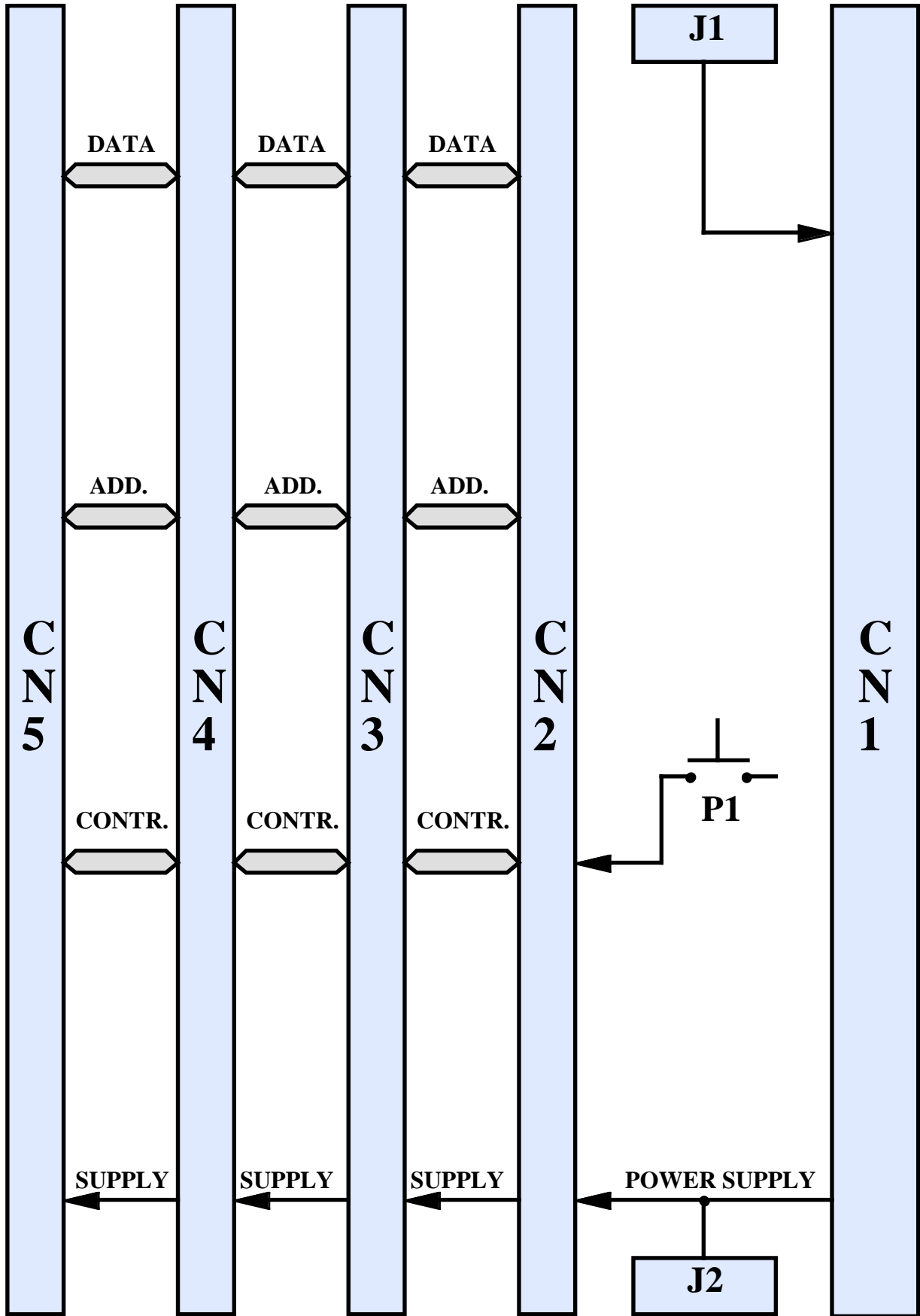


FIGURE 1: SPB04 BLOCK DIAGRAM

## TECHNICAL FEATURES OF SPB 04

### GENERAL FEATURES OF SPB 04

<b>BUS type:</b>	<b>ABACO®</b>
<b>On board resources:</b>	4 slots for BUS <b>ABACO®</b> 1 connector for alternate current to supply <b>SPC XXX</b> cards 1 connector for stabilized power supply 1 reset key
<b>BUS signals:</b>	Provided with termination resistors
<b>Power supply:</b>	Provided with disturb suppressor filter

### PHYSICAL FEATURES OF SPB 04

<b>Connectors:</b>	CN1: 48 pins DIN 41612 D+B+Z type F CN2: 64 pins DIN 41612 A+C type C CN3: 64 pins DIN 41612 A+C type C CN4: 64 pins DIN 41612 A+C type C CN5: 64 pins DIN 41612 A+C type C J1: 4 pins quick release screw terminal connector M J2: 4 pins AMP connector
<b>Size:</b>	130x117 mm for 3 HE rack
<b>Slots pitch:</b>	5 TE
<b>Weight:</b>	178 g
<b>Temperature range:</b>	from 0 to 70 Centigrad degrees
<b>Relative humidity:</b>	from 20% to 90% (without condense)

### ELECTRIC FEATURES SPB 04

<b>Supply voltages:</b>	Stabilized voltages: +5 Vdc, +12 Vdc, -12 Vdc Voltage for SPC XXX: please refer to SPC manual Voltage for back up battery: please refer to SPC manual
<b>Current consumption:</b>	0 mA

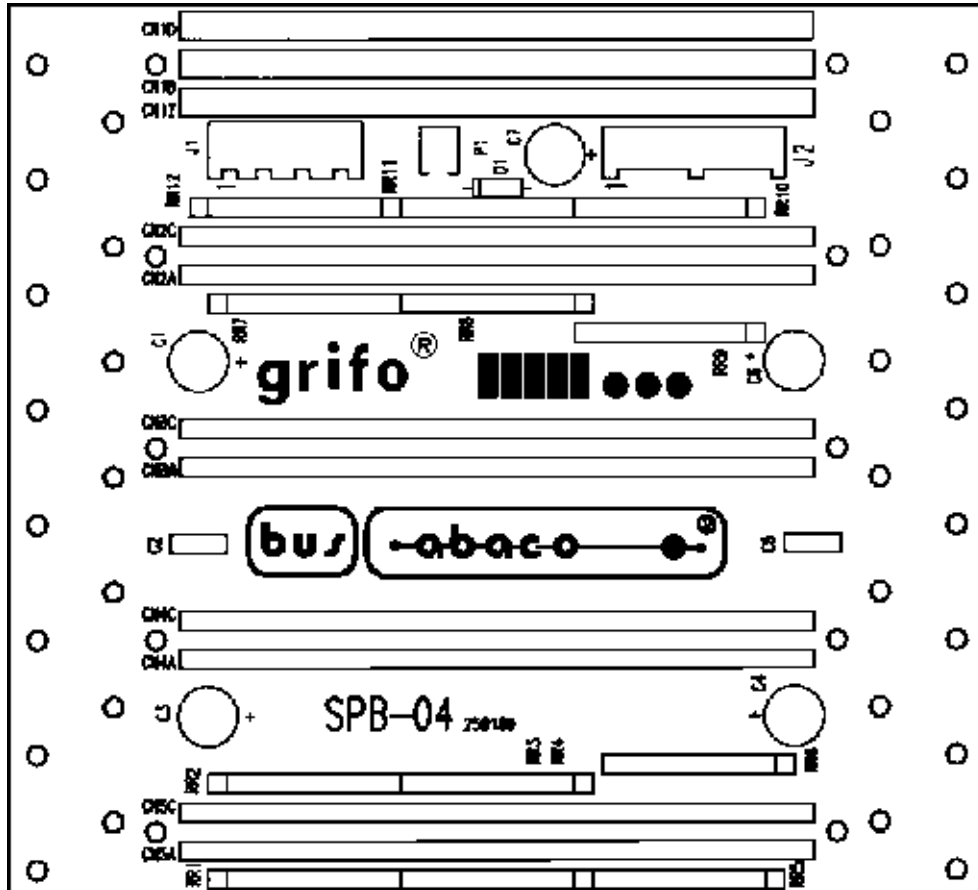


FIGURE 2: SPB 04 COMPONENTS MAP

## TECHNICAL FEATURES OF SPB 08

### GENERAL FEATURES OF SPB 08

<b>BUS type:</b>	<b>ABACO®</b>
<b>On board resources:</b>	8 slots for BUS ABACO® 1 connector for alternate current to supply <b>SPC XXX</b> cards 1 connector for stabilized power supply 1 reset key
<b>BUS signals:</b>	Provided with termination resistors
<b>Power supply:</b>	Provided with disturb suppressor filter

### PHYSICAL FEATURES OF SPB 08

<b>Connectors:</b>	CN1: 48 pins DIN 41612 D+B+Z type F CN2: 64 pins DIN 41612 A+C type C CN3: 64 pins DIN 41612 A+C type C CN4: 64 pins DIN 41612 A+C type C CN5: 64 pins DIN 41612 A+C type C CN6: 64 pins DIN 41612 A+C type C CN7: 64 pins DIN 41612 A+C type C CN8: 64 pins DIN 41612 A+C type C CN9: 64 pins DIN 41612 A+C type C  J1: 4 pins quick release screw terminal connector M J2: 4 pins AMP connector
<b>Size:</b>	130x220 mm for 3 HE rack
<b>Slots pitch:</b>	5 TE
<b>Weight:</b>	305 g
<b>Temperature range:</b>	from 0 to 70 Centigrad degrees
<b>Relative humidity:</b>	from 20% to 90% (without condense)

### ELECTRIC FEATURES SPB 08

<b>Supply voltages:</b>	Stabilized voltages: +5 Vdc, +12 Vdc, -12 Vdc Voltage for SPC XXX: please refer to SPC manual Voltage for back up battery: please refer to SPC manual
<b>Current consumption:</b>	0 mA

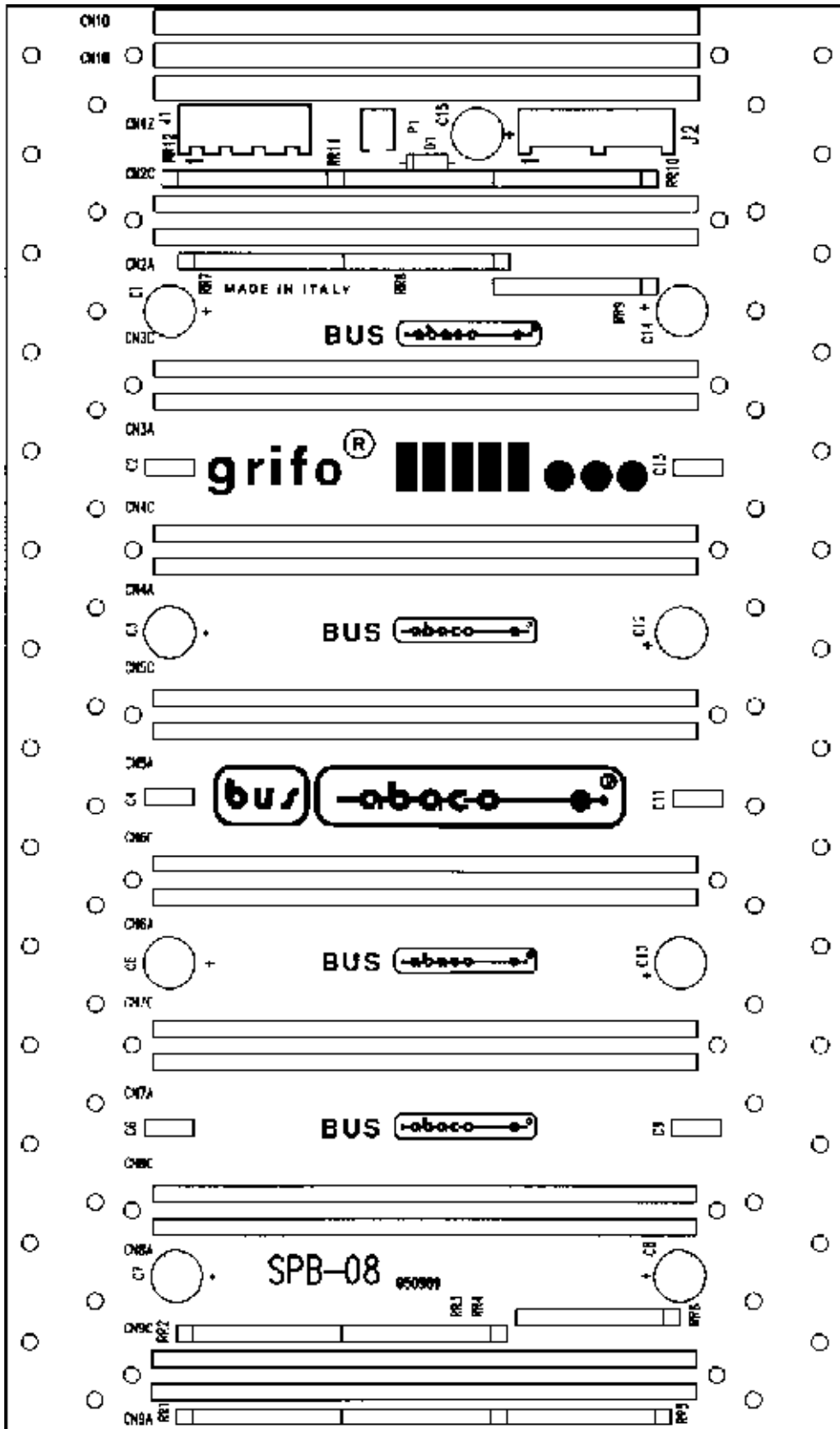


FIGURE 3: SPB 08 COMPONENTS MAP

## INSTALLATION

In this chapter there are information for a right installation and correct use of mother boards **SPB 04** and **SPB 08**.

The User can find the location and functions of each connector and some explanatory diagrams.

## CONNECTIONS

The **PB 04** and **SPB 08** mother boards have several connectors that can be linkeded to the other cards of the system or directly to the field, according to system requirements. In this paragraph there are connectors pin outs, a short signals description (including the signals direction) and connectors location (please see figures 7 and 9).

### J1 - SUPPLY BOARD SPC XXX INPUT VOLTAGES CONNECTOR

J1 is an asymmetric quick release connector featuring 4 lines of pins, where all the signals required by the eventual supply section must be connected. By means of this connector it is possible to supply the whole control system even through a simple alternate current (output of a transformer), and to perform the back up of the system itself through a specific external battery. For further information about the supply cards, please refer to the technical manuals of **SPC XXX** boards.

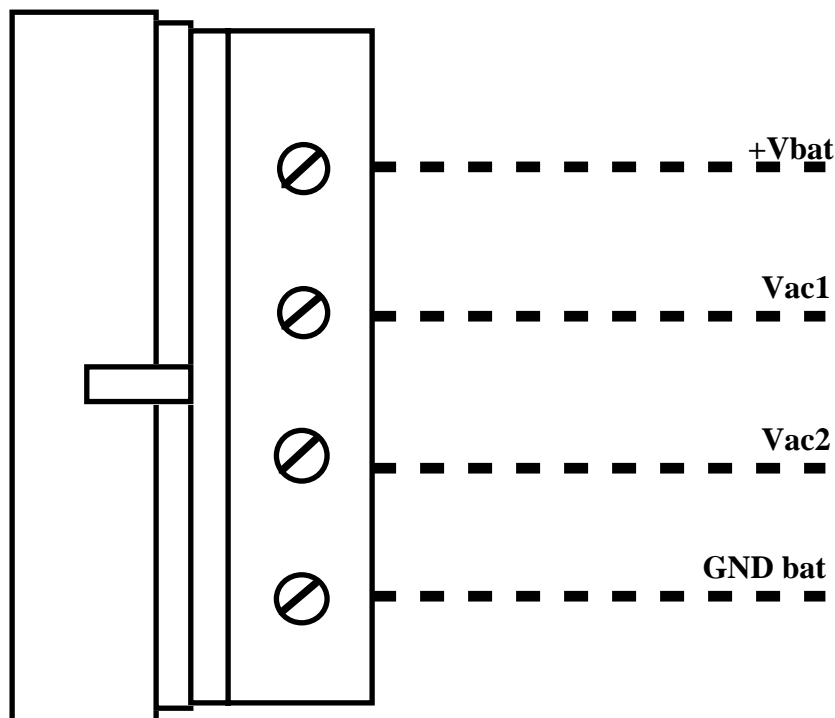


FIGURE 4: J1 - SUPPLY BOARD SPC XXX INPUT VOLTAGES CONNECTOR

Signals description:

- +Vbat** = I - Positive input for back up battery
- GND bat** = - Negative input for back up battery.
- Vac1** = I - Alternate voltage input
- Vac2** = I - Alternate voltage input

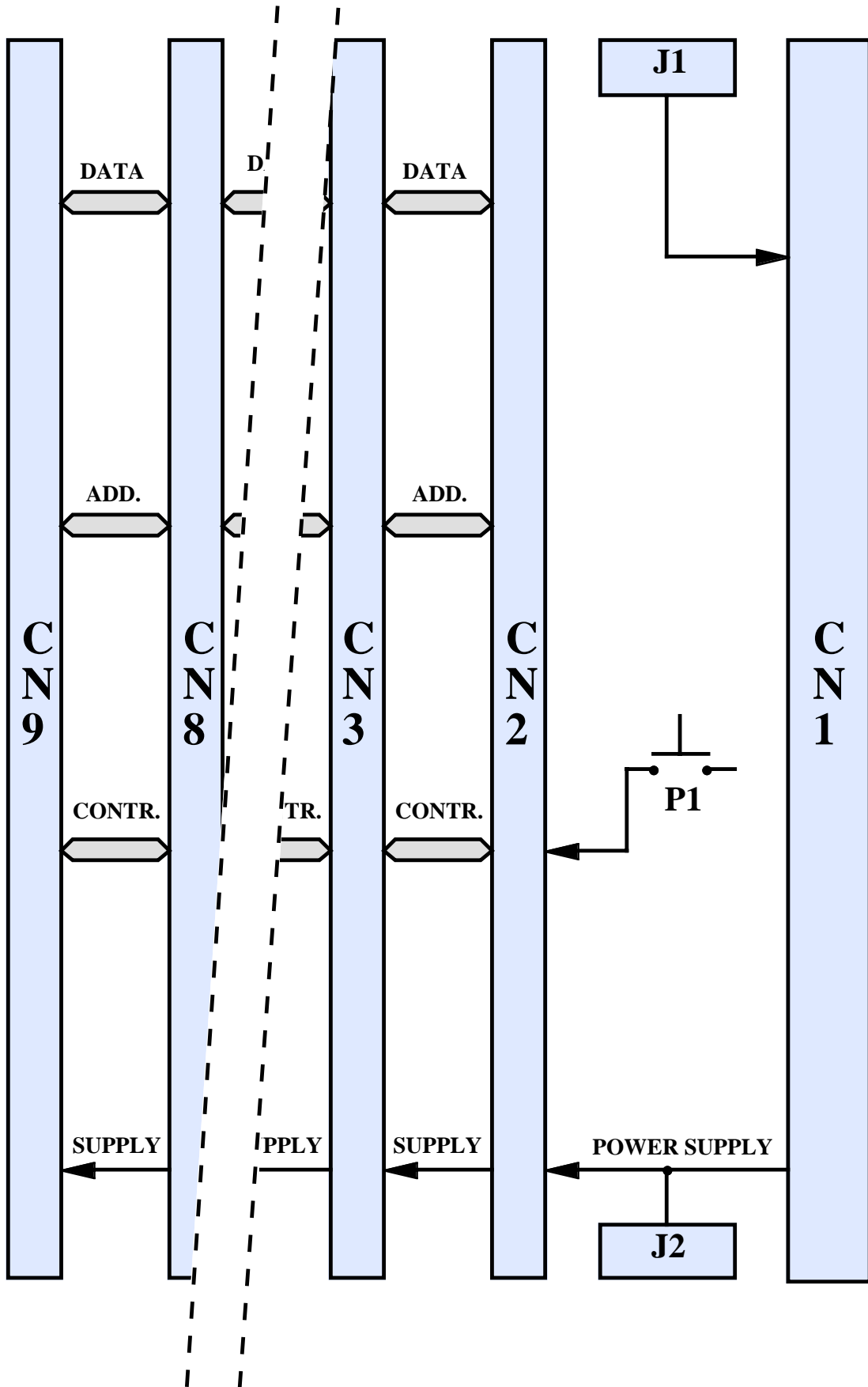
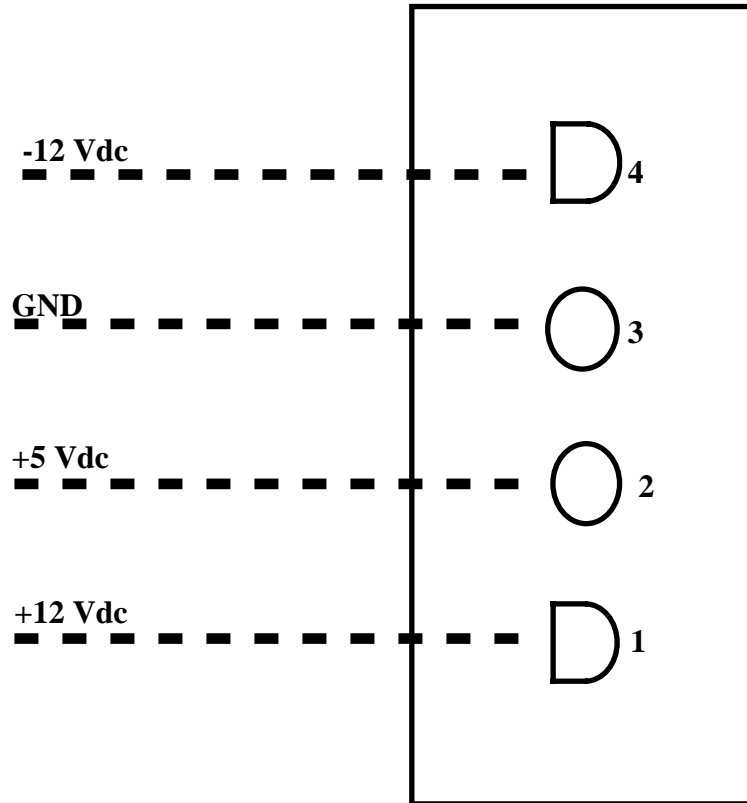


FIGURE 5: SPB 08 BLOCK DIAGRAM

## J2 - STABILIZED SUPPLY VOLTAGES CONNECTOR

J2 is an asymmetric 4 pins AMP connector M, that connects the supply voltages for industrial BUS ABACO®. This connector features a standard pin out for an easy installation, even in case of replacement of the mother board with a model having a greater or lower number of slots. This connector must be used to supply the mother board only when no supply card is connected on J1, otherwise it can be used to supply external devices.



**FIGURE 6: J2 - STABILIZED SUPPLY VOLTAGES CONNECTOR**

Signals description:

- +5 Vdc** = I/O - Supply +5 Vdc for **BUS ABACO®**.
- +12 Vdc** = I/O - Supply +12 Vdc for **BUS ABACO®**.
- 12 Vdc** = I/O - Supply -12 Vdc for **BUS ABACO®**.
- GND** = - Ground signal for **BUS ABACO®**.

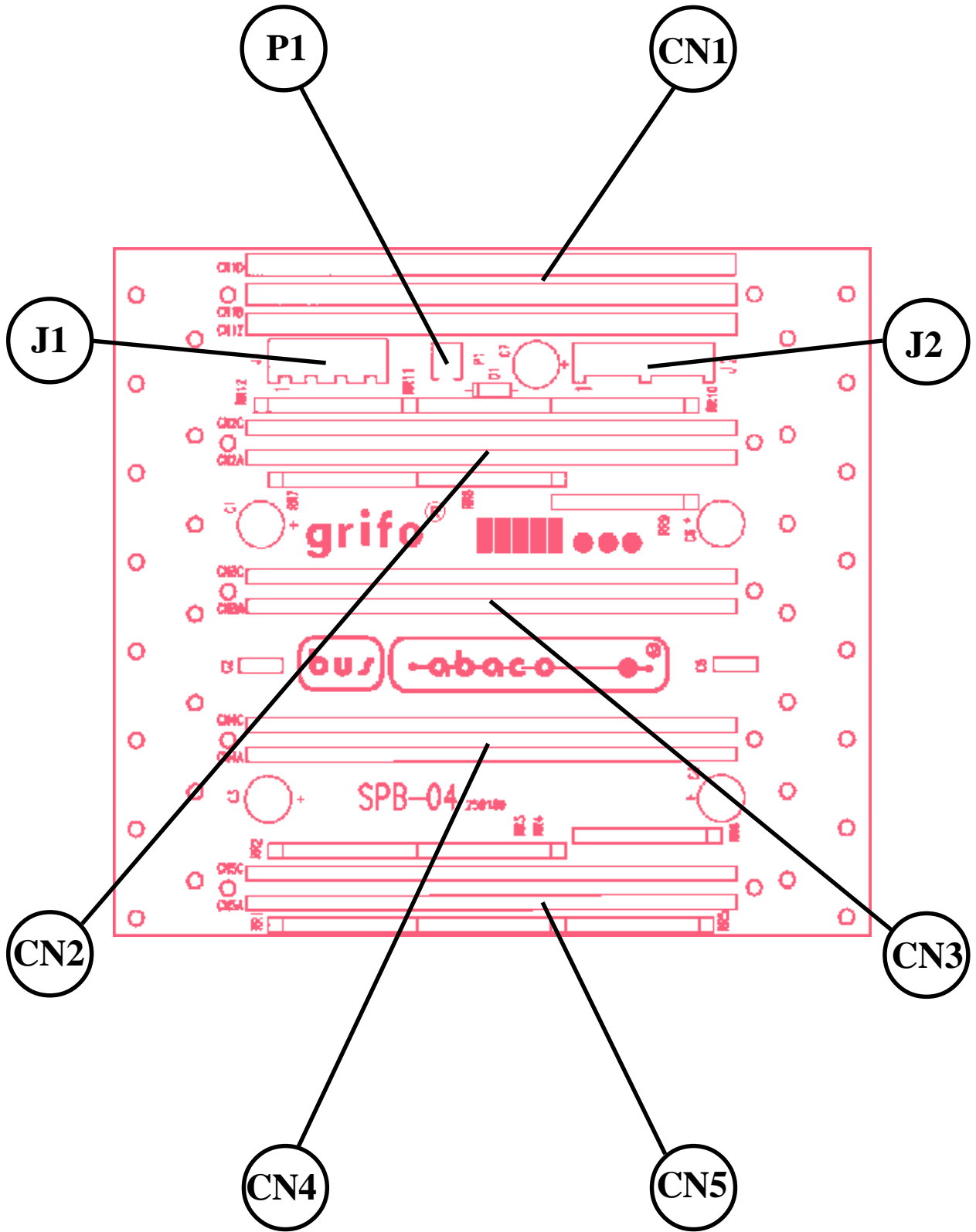


FIGURE 7: SPB 04 CONNECTORS AND RESET KEY LOCATION

**CN1 - SUPPLY BOARD SPC XXX CONNECTOR**

N. PIN	Fila d	Fila b	Fila z
2	+Vbat	+Vbat	+Vbat
4	Vac1	Vac1	Vac1
6	Vac1	Vac1	Vac1
8	Vac2	Vac2	Vac2
10	Vac2	Vac2	Vac2
12	VOUT-Var	SYNC	/RESET
14	P	OSC	INH
16	+5Vdc	+5Vdc	+5Vdc
18	REF +5Vdc	C.L.	REF GND
20	GND +5Vdc	GND +5Vdc	GND +5Vdc
22	GND bat	GND bat	GND bat
24	+12Vdc	+12Vdc	+12Vdc
26	REF GND	N.C.	REF +12Vdc
28	GND +12Vdc	GND +12Vdc	GND +12Vdc
30	GND +12Vdc	GND +12Vdc	GND +12Vdc
32	GND -12Vdc	N.C.	-12Vdc

**FIGURE 8: CN1 - SUPPLY BOARD SPC XXX CONNECTOR**

Signals description:

<b>+Vbat</b>	=	I - Positive input for back up battery
<b>Vac1</b>	=	I - Input for alternate current
<b>Vac2</b>	=	I - Input for alternate current
<b>VOUT-Var</b>	=	O- Voltage signal for supply cards capable to give tensions different from standard tension values ( <b>SPC 03 VB</b> and <b>SPC 03 VT</b> )
<b>SYNC</b>	=	I - Synchronization signal
<b>/RESET</b>	=	O- Power failure signal for system reset
<b>P</b>	=	I - Output voltage regulation signal
<b>OSC</b>	=	O- Power supply internal oscillator signal
<b>INH</b>	=	I - TTL level inhibition signal
<b>+5Vdc</b>	=	O- +5Vdc power supply
<b>C.L.</b>	=	I - Current limitation signal
<b>REF+5Vdc</b>	=	I - Reference signal for +5Vdc supply
<b>REF GND</b>	=	I - Reference signal for ground
<b>GND +5Vdc</b>	=	O- +5Vdc power supply ground
<b>GND bat</b>	=	O- Negative input for back up battery
<b>+12 Vdc</b>	=	O- +12 Vdc power supply
<b>GND +12Vdc</b>	=	O- +12 Vdc power supply ground
<b>REF +12Vdc</b>	=	I - Reference signal for +12Vdc supply
<b>-12 Vdc</b>	=	O- -12Vdc power supply
<b>GND -12 Vdc</b>	=	O- -12Vdc power supply ground
<b>N.C.</b>	=	- Not connected

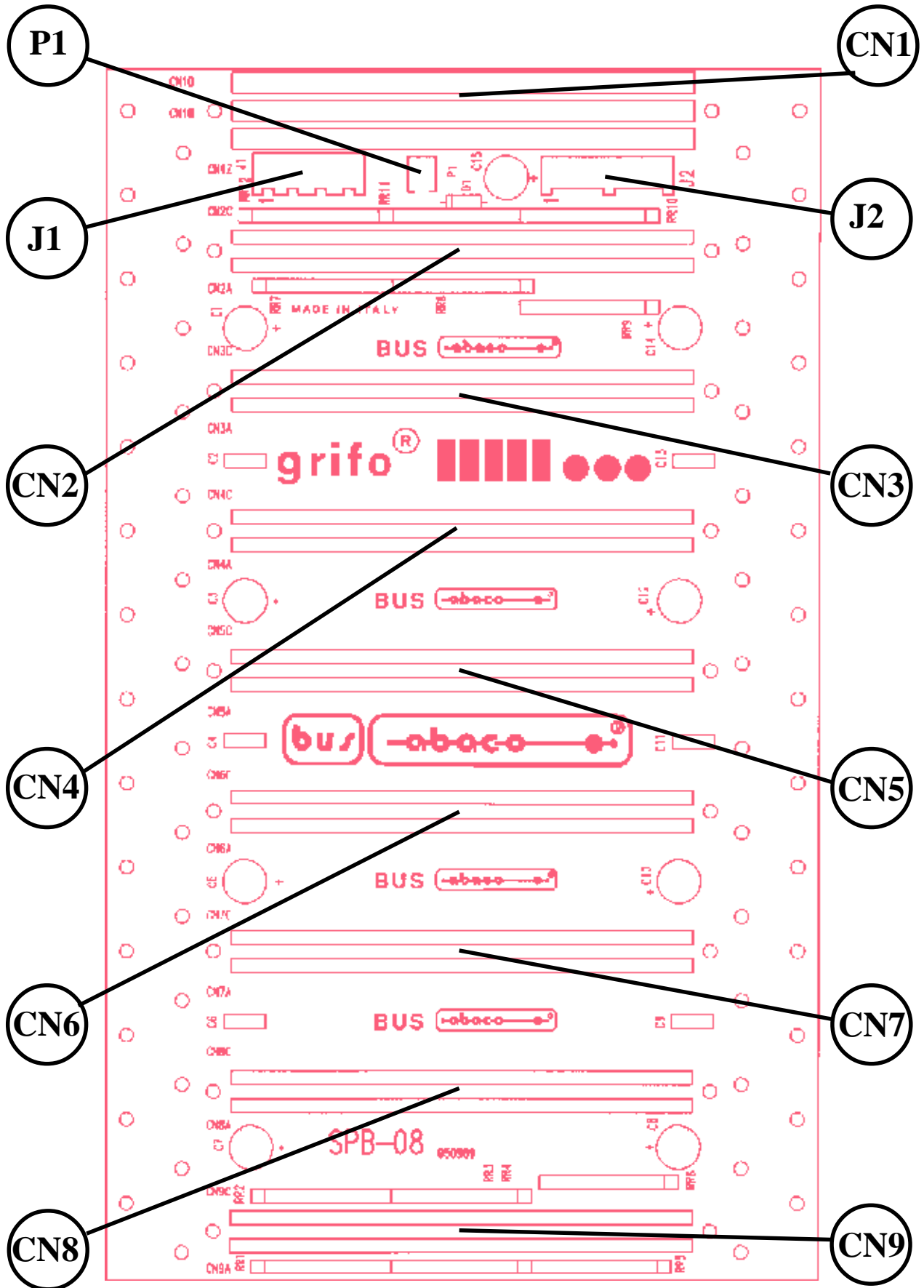


FIGURE 9: SPB 08 CONNECTORS AND RESET KEY LOCATION

**CN2,CN3,CN4,CN5,CN6,CN7,CN8,CN9 - BUS ABACO® CONNECTORS**

CN2, CN3, CN4, CN5, CN6, CN7, CN8, CN9 are 64 pins DIN 41612 A+C type C female connectors, to interface with the industrial BUS ABACO®.

Here follows the standard 8 bits and 16 bits BUS ABACO® pin-out.

Please remark that all the signals here described are TTL, except for the power supplies.

<b>A</b> <b>16 bit BUS</b>	<b>A</b> <b>8 bit BUS</b>	<b>PIN</b>	<b>C</b> <b>8 bit BUS</b>	<b>C</b> <b>16 bit BUS</b>
GND	GND	1	GND	GND
+5 Vdc	+5 Vdc	2	+5 Vdc	+5 Vdc
D0	D0	3	N. C.	D8
D1	D1	4	N. C.	D9
D2	D2	5	N. C.	D10
D3	D3	6	/INT	/INT
D4	D4	7	/NMI	/NMI
D5	D5	8	/HALT	D11
D6	D6	9	/MREQ	/MREQ
D7	D7	10	/IORQ	/IORQ
A0	A0	11	/RD	/RDLDS
A1	A1	12	/WR	/WRLDS
A2	A2	13	/BUSAK	D12
A3	A3	14	/WAIT	/WAIT
A4	A4	15	/BUSRQ	D13
A5	A5	16	/RESET	/RESET
A6	A6	17	/M1	/IACK
A7	A7	18	/RFSH	D14
A8	A8	19	/MEMDIS	/MEMDIS
A9	A9	20	VDUSEL	A22
A10	A10	21	/IEI	D15
A11	A11	22	N. C.	N. C.
A12	A12	23	CLK	CLK
A13	A13	24	N. C.	/RDUDS
A14	A14	25	N. C.	/WRUDS
A15	A15	26	N. C.	A21
A16	N. C.	27	N. C.	A20
A17	N. C.	28	N. C.	A19
A18	N. C.	29	/R.T.	/R.T.
+12 Vdc	+12 Vdc	30	-12 Vdc	-12 Vdc
+5 Vdc	+5 Vdc	31	+5 Vdc	+5 Vdc
GND	GND	32	GND	GND

**FIGURE 10: CN2,CN3,CN4,CN5,CN6,CN7,CN8,CN9 - BUS ABACO® CONNECTORS**

## Signals description:

## 8 bits CPU

<b>A0-A15</b>	=	O	- Address BUS
<b>D0-D7</b>	=	I/O	- Data BUS
<b>INT</b>	=	I	- Interrupt request
<b>NMI</b>	=	I	- Non Maskable Interrupt
<b>HALT</b>	=	O	- Halt state
<b>MREQ</b>	=	O	- Memory Request
<b>IORQ</b>	=	O	- Input Output Request
<b>RD</b>	=	O	- Read cycle status
<b>WR</b>	=	O	- Write cycle status
<b>BUSAK</b>	=	O	- BUS Acknowledge
<b>WAIT</b>	=	I	- Wait
<b>BUSRQ</b>	=	I	- BUS Request
<b>RESET</b>	=	O	- Reset
<b>M1</b>	=	O	- Machine cycle one
<b>RFSH</b>	=	O	- Refresh for dynamic RAM
<b>MEMDIS</b>	=	I	- Memory Display
<b>VDUSEL</b>	=	O	- VDU Selection
<b>IEI</b>	=	I	- Interrupt Enable Input
<b>CLK</b>	=	O	- System clock
<b>R.B.</b>	=	I	- Reset button
<b>+5 Vdc</b>	=	I	- Power supply at +5 Vdc
<b>+12 Vdc</b>	=	I	- Power supply at +12 Vdc
<b>-12 Vdc</b>	=	I	- Power supply at -12 Vdc
<b>GND</b>	=		- Ground signal

## 16 bits CPU

<b>A16-A22</b>	=	O	- Address BUS
<b>D8-D15</b>	=	I/O	- Data BUS
<b>RD UDS</b>	=	O	- Read Upper Data Strobe
<b>WR UDS</b>	=	O	- Write Upper Data Strobe
<b>IACK</b>	=	O	- Interrupt Acknowledge
<b>RD LDS</b>	=	O	- Read Lower Data Strobe
<b>WR LDS</b>	=	O	- Write Lower Data Strobe

N.B.

Directionality indications as above stated are referred to a master (**CPU** or **GPC**®) board and have been kept untouched to avoid ambiguity in case of multi-boards systems.

## RESET KEY

**SPB 04** and **SPB 08** mother boards are provided with a reset key whose purpose is to activate the signal R. T. of industrial BUS **ABACO**<sup>®</sup>. By means of this feature the User can easily reset the whole system installed on the modules, without any need to use an external tool. To easily locate the reset key please refer to figures 7 and 9.

## TERMINATION RESISTORS

A very important feature of **SPB 04** and **SPB 08** mother boards is that all the signals of BUS **ABACO**<sup>®</sup> are provided with a termination resistor.

This feature minimizes the eventual effects due to signals that otherwise would remain floating and in the meantime it warrants the functionality and the perfect interfacing to all the **grifo**<sup>®</sup> industrial boards listing. Thanks to the termination resistors in fact, also boards provided with CMOS BUS interfaces can be connected, obtaining an overall reduction of the power consumption for the application system.

## POWER SUPPLY

To simplify as much as possible the supply of the User application system, **SPB 04** and **SPB 08** mother boards accept two different power sources:

### *- Stabilized power supply*

Connector J2 can be used to provide through an external power supply the supply voltages to the BUS **ABACO**<sup>®</sup> connector signals; such voltages are +12 Vdc, -12 Vdc and +5 Vdc. The User must verify that the external supply can deliver enough power to fulfil the need of all the cards in the system. When a power source is connected to connector J2 no card must be installed in connector CN1 in order to avoid electric conflicts.

### *- SPC XXX supply cards*

Connector CN1 allows to install an **SPC XXX** supply cards. This kind of **grifo**<sup>®</sup> cards is a powerful switching supply in format Eurocard, such format gives the comfortable advantage to be able to mount the supply cards in 3 HE racks and so also on these mother boards.

There are several models that deliver different combinations of voltages and maximum power to fulfil all the possible needs, starting from an external supply provided through connector J1. It is also possible to fetch the stabilized voltages generated by supply cards from connector J2 to supply external loads, in this case please refer to the technical documentation of **SPC XXX** cards to determine the maximum power that can be fetched.

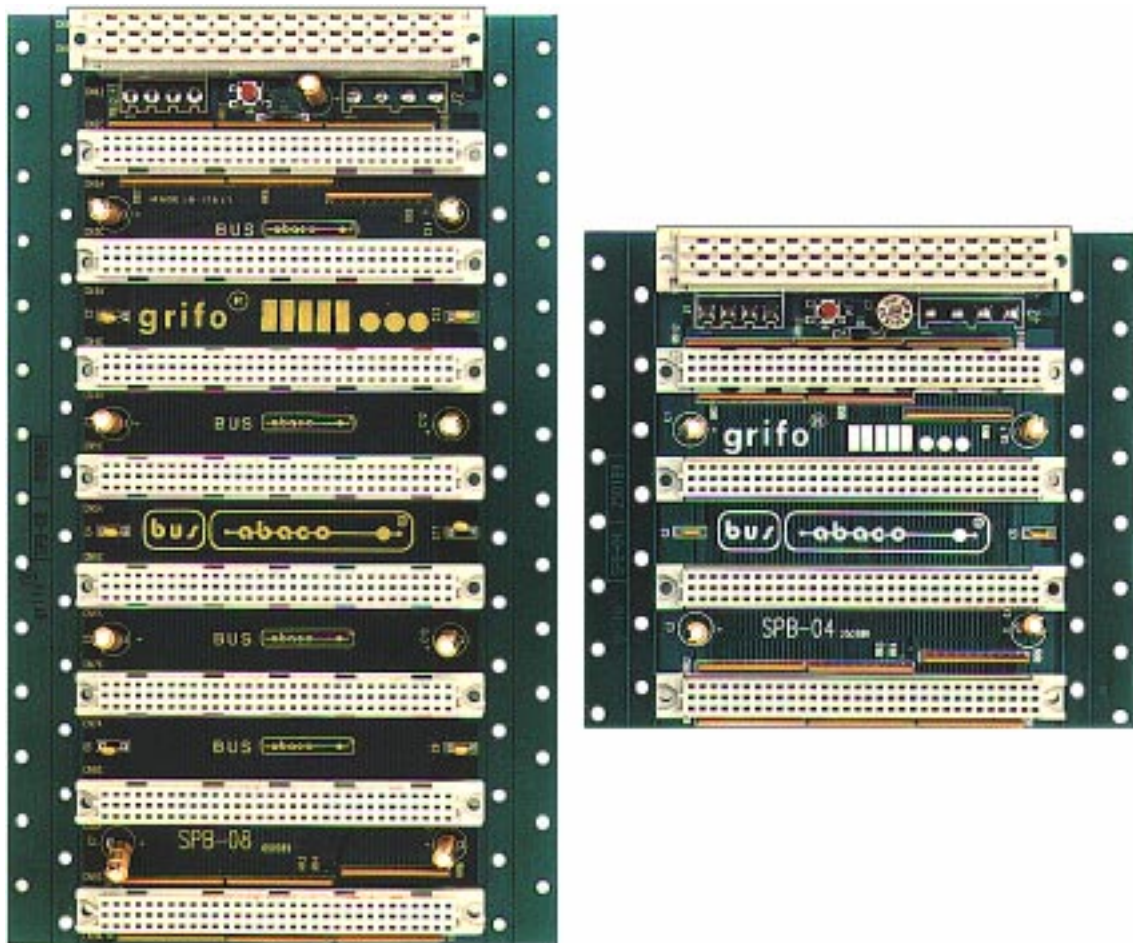


FIGURE 11: SPB 04 AND SPB 08 CARDS PHOTO

## EXTERNAL CARDS

**SPB 04** and **SPB 08** boards can interface to most of **grifo**<sup>®</sup> industrial boards. Their main purpose is to perform a digital Input/Output interfacement between CPU (**GPC**<sup>®</sup>) cards and the external world. Here is reported an illustrative list of cards capable to interact with **SPB 04** and **SPB 08** boards with a short description of their features; for further informations please request the specific documentation.

### **SPC 03-xx**

Switch Power Card xx version

Switching power suppliers able to generate voltage from -12 to +40 Vdc and current up to 4A. Input from 12 to 26 Vac; battery backed; power good; front panel; ABACO<sup>®</sup> standard connector.

### **SPC 03.5S**

Switch Power Card +5 Vdc

Europe format switching power supply capable to provide +5 Vdc to a load of 4 A; input voltage 12÷24 Vac; power-failure; connector for back-up battery; standard connector for mother board **SPB 0x**.

### **SPC 512**

Switch Power Card +5 Vdc +12 Vdc

Europe format switching power supply capable to provide +5 Vdc 5A and +12 Vdc 2.5 A; input voltage 12÷24 Vac; power-failure; connector for back-up battery; standard connector for mother board **SPB 0x**.

### **JMS 34**

Jumbo Multifunction Support for Axis control

Generic peripheral axis control card. 3 optocoupled acquisition channels, with 16 bits bidirectional counter, for incremental encoder. 4 12bits  $\pm 10$ Vdc D/A channels. 8 Opto-in; 8 NPN Opto-output 40Vdc 500 mA. All I/O lines displayed with LEDs.

### **GPC<sup>®</sup> 51**

General Purpose Controller fam. 51

Microprocessor family 51 INTEL including the masked BASIC chip; the board features: 16 I/O TTL lines; dip switch; 3 timer/counter; RS 232; 4 A/D converter signals resolution 11 bit; buzzer; on board EPROM programmer; RTC and 32K SRAM with Lithium battery back up; controller for display and keyboard.

### **GPC<sup>®</sup> 15A**

General Purpose Controller 84C15

Full CMOS card, 10÷20 MHz 84C15 CPU; 512K EPROM or FLASH; 128K RAM; 8K RAM and RTC backed; 8K serial EEPROM; 1 RS 232 line; 1 RS 232 line or RS 422-485 or Current Loop line; 32 or 40 TTL I/O lines; CTC; Watch dog; 2 Dip switches; Buzzer.

**GPC® 188F**

## General Purpose Controller 80C188

80C188  $\mu$ P 20MHz; 1 RS 232 line; 1 RS 232, RS 422-485 or Current Loop line; 24 TTL I/O lines; 1M EPROM or 512K FLASH; 1M RAM Lithium battery backed; 8K serial EEPROM; RTC; Watch Dog; 8 Dip switch; 3 Timer Counter; 8 13 bit A/D lines; Power failure; activity LEDs; single power supply +5Vdc.

**GPC® 150**

## General Purpose Controller 84C15

Microprocessor Z80 at 16 MHz; implementation completely CMOS; 512K EPROM or FLASH; 512K SRAM; RTC; Back-Up through external Lithium battery; 4M serial FLASH; 1 serial line RS 232 plus 1 RS 232 or RS 422-485 or current loop; 40 I/O TTL; 2 timer/counter; 2 watch dog; dip switch; EEPROM; A/D converter with resolution 12 bit; activity LED.

**LAD 12**

## Low cost Analog to Digital conv. 12 bits

Dual slope 16 lines A/D converter; 12 bit + sign conversion; 12,5 conversions per second rate; range  $\pm 2,048$  Vdc or  $0 \div 20$  mA; automatic running mode; 1 LED, 2 TTL input lines; 8 bit Bus; front panel.

**LAD 15**

## Low cost Analog to Digital conv. 15 bits

Dual slope 16 lines A/D converter; 15 bit + sign conversion; 2,5 conversions per second rate; range  $\pm 3,2768$  Vdc or  $0 \div 20$  mA; automatic running mode; 2 LEDs; 2 TTL input lines; 8 bit Bus; front panel.

**LAD 415**

## 4 Low cost Analog to Digital conv. 15 bits

4 independent A/D converter; 15 bit + sign conversion; 40 conversions per second rate; range  $\pm 3,2768$ ,  $\pm 5$ ,  $\pm 10$  Vdc;  $4 \div 20$  mA; automatic running mode; 2 LEDs; 2 TTL input lines; 8 bit Bus.

**DAC 16**

## Digital to Analog Converter 16 bits

2 Digital to Analog converter, 16 bits galvanically insulated; programmed data displayed;  $\pm 10$  Vdc output; gain and offset setting; 8 bit Bus; standard addressing.



## APPENDIX A: ALPHABETICAL INDEX

**A****ABACO® 10, 14****C****CARD VERSION 1****CONNECTIONS 8****CONNECTORS 8****CN1 12****CN2,CN3,CN4,CN5,CN6,CN7,CN8,CN9 14****J1 8****J2 10****CURRENT CONSUMPTION 4, 6****E****ELECTRIC FEATURES SPB 04 4****ELECTRIC FEATURES SPB 08 6****EXTERNAL CARDS 18****G****GENERAL FEATURES OF SPB 04 4****GENERAL FEATURES OF SPB 08 6****GENERAL INFORMATIONS 2****I****INSTALLATION 8****INTRODUCTION 1****O****ON BOARD RESOURCES 4, 6****P****PHYSICAL FEATURES OF SPB 04 4****PHYSICAL FEATURES OF SPB 08 6****PITCH 2****POWER SUPPLY 16****R****RELATIVE HUMIDITY 4, 6****RESET KEY 16**

**S**

SIZE 4, 6

SPC 8, 12, 16

SUPPLY VOLTAGES 4, 6

**T**

TECHNICAL FEATURES OF SPB 04 4

TECHNICAL FEATURES OF SPB 08 6

TEMPERATURE RANGE 4, 6

TERMINATION RESISTORS 2, 4, 16

**W**

WEIGHT 4, 6